ISO
TC184/SC4

Usage of UML in SC4

- UML Overview
- UML applicability in SC4
- Potential actions
- Recommendations

ISO
TC184/SC4

UML Overview

- UML (Unified Modeling Language) Components
  - activity diagram
  - class diagram
  - collaboration diagram
  - component diagram
  - deployment diagram
  - object diagram
  - sequence diagram
  - state chart diagram
  - use case diagram

ISO
TC184/SC4

UML Applicability in SC4

- **ISO TC184/SC4: Industrial Data**
- **Relevant for data**
  - **UML diagram types**
    - class diagram
    - object diagram
    - use case diagram
    - activity diagram
- **Irrelevant for SC4**
  - **UML diagram types**
    - component diagram
    - deployment diagram
- Behavioural modelling
  - **UML diagram types**
    - state chart diagram
    - collaboration diagram
    - sequence diagram
  - **Already relevant for the documentation of**
    - Constraints (Code)
    - Assumptions
    - Intentions
  - **More relevant with EXPRESS-2**

ISO
TC184/SC4

UML Activity Diagram

- **Features**
  - **Flow of control**
    - **Branching, parallelism, synchronisation**
    - **Associated objects**
  - **Lacking from IDEF0**
    - **Simple decomposition**
    - **Resources**
    - **Distinction between Input and Control**
- **Potential for SC4**
  - **Definition for model scope**
    - STEP
      - AAM
      - Currently IDEF0
      - Concern: technical diversity
    - Oil&Gas
      - through AP221
    - PLIB, MANDATE
      - Not used
  - **Requirement to be modelled**
    - STEP, MANDATE, Oil&Gas
    - Not PLIB

Applicability

ISO
TC184/SC4

UML Class Diagram

- **Features**
  - **OO system specification**
  - **Semantic variation points**
  - **Problem: name scopes**
- **Potential for SC4**
  - **Definition of object structure**
    - STEP
      - ARM
      - Not AIM or IRs
    - PLIB, MANDATE, Oil&Gas
  - **Definition of object behaviour**
    - STEP
      - ARM future?
    - SDAI
      - Dictionary future?
    - PLIB, MANDATE, Oil&Gas
      - Concern: interoperability
  - **Requirement to be modelled**
    - STEP, PLIB, MANDATE, Oil&Gas

Applicability

ISO
TC184/SC4

UML Object Diagram

- **Features**
  - **Instance diagram**
- **Potential in SC4**
  - **Where UML class diagrams are used**
    - **Examples**
    - **ATSs**

Applicability

ISO
TC184/SC4

UML Use Case Diagram

- **Features**
  - **External functional view of a system**
    - Actors
    - Roles
- **Potential for SC4**
  - **Definition of model scope**
    - STEP
      - Complement to AAM (IDEF0 or UML)
    - PLIB, MANDATE, Oil&Gas
      - Not used
  - **Implementation Conceptualisation**
    - PLIB
      - ISO 13584-10
      - Too late
    - STEP, MANDATE, Oil&Gas
      - Not intended

Applicability

ISO
TC184/SC4

UML State Chart Diagram

- **Features**
  - **State machine**
    - **States and transitions**
- **Potential for SC4**
  - **Documentation of code**
    - **STEP, PLIB, MANDATE, Oil&Gas**
      - Not used
  - **Documentation of assumptions**
    - **STEP, PLIB, MANDATE, Oil&Gas**
      - Not used
  - **Requirement to be modelled**
    - EACM

Applicability

ISO
TC184/SC4

UML Collaboration Diagram

- **Features**
  - **Interaction of objects, based on roles**
  - **Relationships between roles**
  - **No time dimension**
- **Potential for SC4**
  - **Documentation of code**
    - **STEP, PLIB, MANDATE, Oil&Gas**
      - Not used
  - **Documentation of assumptions**
    - **STEP, PLIB, MANDATE, Oil&Gas**
      - Not used

Applicability

ISO
TC184/SC4

UML Sequence Diagram

- **Features**
  - **Interactions of objects over time**
- **Potential for SC4**
  - **Documentation of code**
    - **STEP, PLIB, MANDATE, Oil&Gas**
      - Not used
  - **Documentation of assumptions**
    - **STEP, PLIB, MANDATE, Oil&Gas**
      - Not used

Applicability

ISO
TC184/SC4

Potential Actions

- **Usage of appropriate UML diagrams always possible for documentation and explanation**
- **Potential impact on SC4 document architecture(s)**
  - ✕ **Approve use case diagrams** **Y** **N**
  - ✕ **Approve activity diagram AAMs** **Y** **N**
  - ✕ **Remove IDEF0 AAMs** **Y** **N**
  - ✕ **Approve class diagram ARMs** **Y** **N**
  - ✕ **Remove IDEF1X ARMs** **Y** **N**
  - ✕ **Remove EXPRESS-G ARMs** **Y** **N**
  - ✕ **Remove EXPRESS ARMs** **Y** **N**

UML

ISO
TC184/SC4

Recommendations

- *to be derived*